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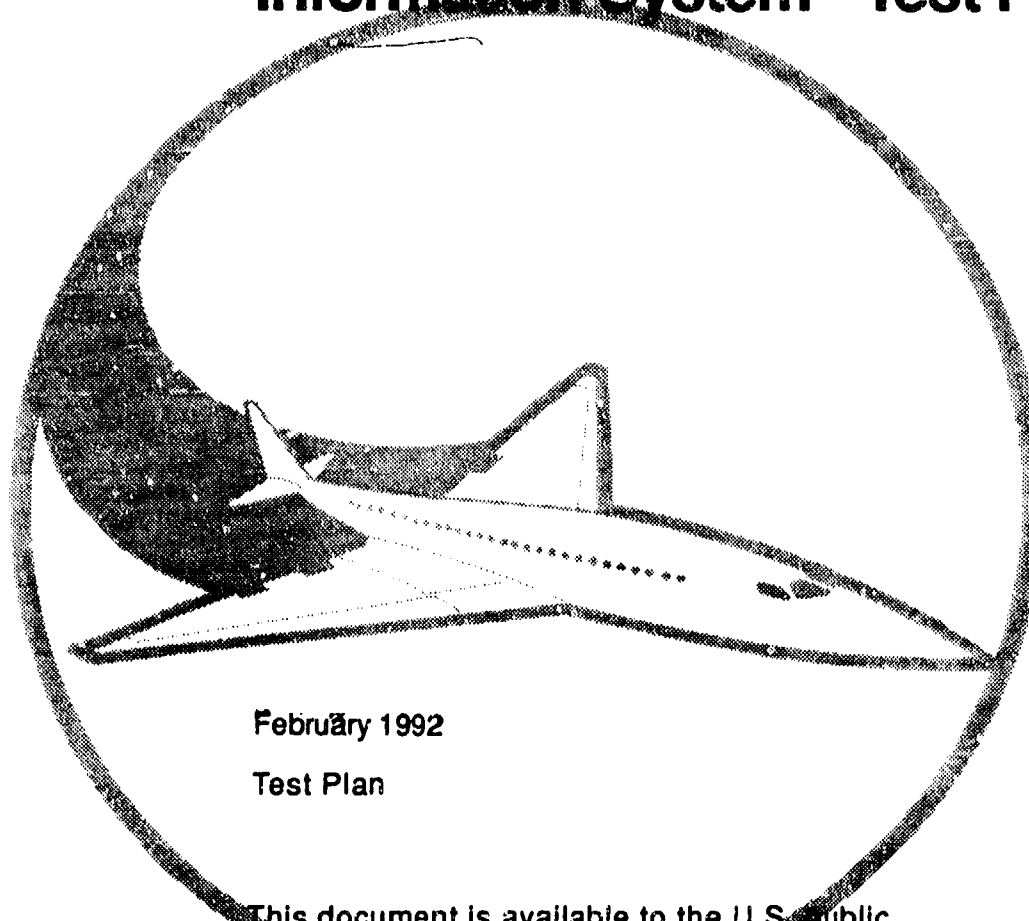


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FAA Technical Center  
Atlantic City International Airport  
N.J. 08405

# International Aircraft Operator Information System - Test Plan



February 1992

Test Plan

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## EXECUTIVE SUMMARY

This test plan outlines a method for determining whether the International Aircraft Operator Information System is ready to become operational as a prototype system. The system has been operational on a very limited basis since August 1990. During the review, Federal Aviation Administration (FAA) personnel will be able to examine information system documentation, data base contents, information system processes, and reports. The actual tests will consist of entering the system, generating queries, and reviewing audits. In the course of carrying out these activities it will be possible to review all of the technical and operational aspects of the system.

## 1. INTRODUCTION.

### 1.1 BACKGROUND.

The Federal Aviation Administration (FAA) has a continuing need to distribute timely airworthiness safety information to the operators and owners of aircraft with a United States Type Certificate. Timely notification of maintenance, repair, and modification issues is one of the basic tenets of our eminence as a world leader in aviation safety. The FAA's Aviation Standards National Field Office (AVN) carries out this responsibility by reference to a United States Civil Aircraft registration list and several air carrier listings. These lists are not all-inclusive and considerable manual cross-checking is required. These manual processing methods are laborious, time consuming, and error-prone.

The major complicating factor regarding the timely distribution of airworthiness information is the fact that the United States Civil Aircraft Registry correctly records only the legal owner of the aircraft, which may or may not be the operator. The registered owner of turbine powered and large piston powered aircraft is often a financial institution. Further, subleasing practices often result in tiers of operators of an aircraft. The current operator, therefore, may not receive important airworthiness information. The methods presently employed by the FAA are not adequate to meet demands for current aircraft operator data.

This program (reference 1) began with a 10-month effort (Phase I) during which a Master Requirements and Implementation Plan (reference 2) was developed and the evaluation of existing data bases (reference 3) was completed. Also included in Phase I was a feasibility demonstration in which a data supplier from the private sector provided aircraft operator data to selected FAA offices on a telephone call-in basis. An examination of the logs of the telephone calls contributed to the determination of the requirements of the FAA for aircraft operator data. Phase II consists of the development, testing, and operation of an international Aircraft Operator Information System. At the end of the second phase an operational system will be delivered to the FAA.

### 1.2 PURPOSE.

Phase II (reference 4) of the international Aircraft Operator Information System is a 22-month effort with the first 11 months used for the development of a prototype information system and the final 11 months devoted to the operation and further development of the prototype. Before the prototype is operated, a review and test of the system is required. The purpose of this document is to provide a methodology for the FAA and project staff to evaluate and test the performance of the prototype system before it goes into operation.

## 2. TECHNICAL APPROACH.

There are four components of the information system which should be evaluated or tested before the system becomes operational. These components are (1) reports generated from the data tables, (2) processes required for creation and maintenance of the tables, (3) contents of the data tables, and (4) user documentation.

### 2.1. REPORTS.

All reports will be accessed by means of menus. Only those reports to which the user has access will appear on the menus. The menu will give a descriptive name for the reports and each screen will give assistance on the use of the system. Information may be entered into a field directly or selected from pull-down menus. Reports may be obtained either as displays, screen prints, or files which can be downloaded and printed. The reports that will be included in the test are as follows:

a. MASTER FILE. This report will be a screen display in which the user will enter indexed items about an aircraft and the system will return screens which contain basic information about each aircraft which matches the entered information. Typical inputs include registration number, aircraft manufacturer, aircraft model, aircraft series, operator name, or owner name. It will be possible to enter incomplete information on an aircraft and still obtain all possible matches. The screens will contain the remaining information as well as other attributes such as addresses and telephone numbers. The user can either view the information on the screen or obtain a printed copy by means of the print screen feature, if available on the users terminal.

b. HISTORY. The user will supply information as in the master report and an aircraft owner, operator, and registration history will be displayed on the screen for all of the aircraft in the Lundkvist (reference 3) data base. Other current information will be available on a pop-up screen. The user can either view the information on the screen or obtain a printed copy by means of the print screen feature.

c. OPERATOR ADDRESSES. The user may select codes for manufacturer-model-series for classes of aircraft from pull-down menus. After the selection is complete, a file will be prepared which contains the full mailing addresses (or just name and telephone numbers) of the operators of these aircraft. The file will be sorted and stored in address label format. These labels will be available for downloading. The selection process will be completely menu driven. The downloading process will require that the user be familiar with file transfer software on the user's personal computer or terminal.

d. DATA BASES. The complete data base of each data supplier will be available for viewing on the screen. Since each data base contains a great deal more information than is in the master data base or in any of the individual reports, the screen will be especially useful for more specialized queries.

e. STANDARD QUERY LANGUAGE. One of the menu selections will result in a Standard Query Language (SQL) cursor. SQL is the underlying data base query language of ORACLE. The knowledgeable user will be able to carry out highly specialized queries or merely browse the data base tables for useful information.

These reports will be tested by demonstrations provided by Wichita State University (WSU) program personnel and by hands-on use by FAA personnel, both on site at WSU and remotely via modems.

## 2.2 PROCESSES.

The most important processes at the review point in the program will be system updates, communication software, security, menuing, report generation, and disaster recovery. Each of these will be addressed in the course of the review of the reports; but because of their importance, it is advisable that they be addressed explicitly.

### 2.2.1. Updates.

The monthly updates of the system are, and will continue to be, the most difficult single task in this program. By the time the system is tested, approximately seven updates will have been completed. The occurrence of updates will be apparent in the reports previously generated. The accuracy of the updates can also be verified by the data audits described in a later section. The update procedure should be reviewed by the FAA and the monthly activity reports should be examined. These reports show the model counts and counts of changes in the number of active aircraft.

### 2.2.2. Communication Software.

It is important that the system be tested on site at WSU and over a telephone via a modem. Project personnel will prepare the communication software needed to log on to the system and emulate the proper terminal. This software will be prepared for compatible communications software packages. In the course of testing the reports, this software will be tested. Of particular importance is the verification that all the necessary key assignments are made, the screen graphics are suitably displayed, and the documents sent by file transfer protocols are received.

### 2.2.3. Menus.

It is planned that this system be highly menu driven. It is desirable that the navigation between reports be clear and that the system provide manageable exits from user mistakes. It is essential that during the course of testing the reports that special consideration be given to menu evaluation.

### 2.2.4. Security.

Security for the WSU National Institute for Aviation Research (NIAR) is implemented at several levels. When users first dial into the system they are actually connected to an AT&T ISN (a data switch). The only prompt presented is "dial:". The user must know the correct name to make connection with the



system that runs the FAA aircraft data base. Once connected with this system, the user is asked for his UNIX login and password. All outside users will be given a very restricted UNIX environment which will allow access to ORACLE menus and nothing else. Only limited users will be able to access the UNIX shell. Access to ORACLE menus is also controlled by a login/password and is further restricted by a security level given to each user. The actual menus presented to a low level user will reflect only those processes available at that level. For example, a high-level user ( NIAR staff member) might see this menu

SYSTEM MAINTENANCE  
DATA BASE UPDATE PROCEDURES  
SINGLE AIRCRAFT QUERIES  
AIRLINE FLEET QUERIES  
AIRCRAFT HISTORY  
AVN DIRECTIVES LISTS  
VENDOR DATA BASES

AND .. a mid-level user (FAA managers) might see only this

SINGLE AIRCRAFT QUERIES  
AIRLINE FLEET QUERIES  
AIRCRAFT HISTORY  
AVN DIRECTIVES LISTS  
VENDOR DATA BASES

AND .. a low-level user (FAA clerks) might see only this

SINGLE AIRCRAFT QUERIES  
AIRLINE FLEET QUERIES  
AIRCRAFT HISTORY  
AVN DIRECTIVES LISTS

Security for this system can be tailored for individuals and for groups. Security into the UNIX system will be administered by the NIAR staff, but the ORACLE security could be administered by NIAR or FAA personnel.

Testing of the security features will require that users at three different levels of access be defined to the system (UNIX and ORACLE). The system should then be accessed from a remote site off-campus using commercial communications software and at least two different brands of modems. Being off campus will remove the testing from the peculiarities of our internal networks and modem pools, and using different software and modems will show that the user interface is generic in nature.

All three security levels should be tested to verify that each can reach its target application and is blocked from all others.

### 2.2.5. Disaster Backup and Recovery.

Procedures in place have already shown the ability to recover from partial and total system failure. Nightly exports make a copy of all data bases on a separate physical drive. This allows a fast import of any corrupted tables. Twice a week the exports are moved to tape media. This permits a complete ORACLE system to be rebuilt if a total hardware or software failure occurs. To date recoveries have been successfully carried out from two total ORACLE failures and one hardware failure.

### 2.3 CONTENTS.

Several audits are routinely prepared to test the completeness and integrity of the data. The results of these audits will be supplied during the review. These audits check for duplicate aircraft as well as find discrepancies in keys, operators, and registration numbers. Examples of lines in the exception reports which include typical errors (in bold) are given below. These audits find incorrect classifications and omissions as well as typographical errors and transpositions.

| REG   | CODE  | VEND1<br>SERIAL | VEND2<br>SERIAL | VEND3<br>SERIAL | VEND4<br>SERIAL | VEND5<br>SERIAL |
|-------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|
| N1234 | B-727 | 24326           | 24326           | <b>24236</b>    | 24326           | 24326           |

| REG   | VEND1<br>CODE | VEND2<br>CODE | VEND3<br>CODE | VEND4<br>CODE | VEND5<br>CODE |
|-------|---------------|---------------|---------------|---------------|---------------|
| N1234 | B-727         | <b>A-300</b>  | B-727         | B-727         | B-727         |

| KEY       | VEND1<br>REG | VEND2<br>REG | VEND3<br>REG | VEND4<br>REG | VEND5<br>REG |
|-----------|--------------|--------------|--------------|--------------|--------------|
| B727/2345 | N1234        |              | N1234        | <b>X234</b>  | N1234        |

### 2.4 DOCUMENTATION.

Full system documentation will not be prepared until the end of the program but user manuals will be necessary for training and prototype system operation. Of particular importance will be the instructions on communications software and terminal emulation because of the wide variety of commercially available packages. Moreover, the screen instructions and menus are not available until a user has successfully logged on to the system. The test of the system operation via modem will also test the instructions for potential users.

### 3. CONCLUDING REMARKS.

In addition to the specific test described, the system should be evaluated with regard to its ability to carry out the functions required by the FAA. The specific screens and reports are prepared as a result of the research done in Phase I and reported in the Master Requirements and Implementation Plan (reference 1).

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